23. New urbanisation in China: A multidimensional perspective— Empirical analysis of 289 prefecture and higher-level cities

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Since the first city came into being, the study of cities has been incessant. With the deepening of social divisions of labour and the expansion of industrialisation, urbanisation has become the dominant trend of the times and its study has become increasingly contested. The main stimulus of China's traditional urbanisation process is industrialisation, which is reflected in its export and investment-oriented economic growth model. However, in the process of promoting urbanisation, the mode of extensive industrial production caused a series of economic and social problems, including serious resource waste and environmental pollution. The deepening trend of population ageing has led to a declining demographic dividend—a dilemma for the export-oriented manufacturing industry, in which cheap labour is the main competitive advantage. Government-led large-scale infrastructure and investment in fixed assets are unsustainable, leading to a much faster rate of land urbanisation than that of population. In addition, the household registration (*hukou*) system disadvantages migrant workers in urban areas, resulting in unequal distribution of public services between urban residents and rural and regional migrant workers. Therefore, China's traditional pattern of urbanisation has reached a turning point in its development and faces a crucial transformation. Working out how to break through the dilemma of the traditional mode of urbanisation and embark on a path of new urbanisation with Chinese characteristics—a sustainable and people-centred model of urbanisation—have become important tasks for China in the new era.

From traditional urbanisation to new urbanisation

The traditional model of urbanisation—simply pursuing urban population growth and scale expansion—is unsustainable, and has created many social and economic problems. This has led to a search for a pattern of sustainable urbanisation—the idea of 'new urbanisation'.

New urbanisation with effective resource utilisation and environmental protection

The extensive development model of high consumption and high pollution is unsustainable, meaning the primary task of new urbanisation is to transform from a high-carbon to a low-carbon economy. Therefore, this new type of urbanisation must provide effective resource utilisation and protect the environment. The difficulties inherent in the traditional model of urbanisation are as follows.

High energy consumption

In 2015, China's gross domestic product (GDP) accounted for 15 per cent of the global total, however, its primary energy consumption accounted for about 22.9 per cent. Most of China's energy consumption occurred in its cities. At present, China faces a double disadvantage of high energy consumption and low utilisation efficiency. Urban energy consumption will grow year by year with increasing urbanisation. The International Energy Agency (IEA) predicted that, in 2015, China would account for 79 per cent of city energy consumption—nearly 23 per cent higher than the urbanisation rate of 56.1 per cent in that year—and will soar to 83 per cent by 2030.

High water consumption

China has serious water shortage and pollution problems. Rapid urbanisation has seen urban water use shift from industrial demand to household use. The efficiency of urban water usage directly determines the quality of urbanisation. According to China's Ministry of Water Resources, nearly 400 of 661 cities are in a water deficit, and among those more than 100 cities are experiencing a serious water shortage.

High land consumption

Urban sprawl is a common occurrence in China. According to the National Bureau of Statistics (NBS), urban built-up areas in China amounted to 12,856 sq km in 1990 and surged to 49,772 sq km by 2014, with an average annual growth rate of 5.56 per cent, while the urbanisation rate in the same period increased from 26.4 per cent to 54.8 per cent—an average annual growth rate of only 2.96 per cent—which means the growth rate of built-up areas is nearly two times that of urbanisation (see Table 23.1). This demonstrates that the speed of land urbanisation is much faster than that of population in China.

Table 23.1 China's urbanisation rate and amount of built-up area over time

	1990	2000	2010	2013	2014
Urbanisation rate (%)	26.4	36.2	50.0	53.7	54.8
Built-up area (sq km)	12,856	22,439	40,058	47,855	49,773

Source: NBS (2015c).

High pollution

According to the Ministry of Environmental Protection's 2015 *China Environmental State Bulletin*, among the first 74 cities implementing its new Ambient Air Quality Standards, the average number of days in which that standard was met in 2015 was about 260, with a standard-reaching rate of only 71.2 per cent. The average annual concentration of particulate matter (PM) 2.5 is 55 µg per cubic metre, which is 1.57 times that of China's secondary standard (35 µg per cu m). Among these 74 cities, only Zhoushan, Fuzhou, Xiamen, Shenzhen, Zhuhai, Jiangmen, Huizhou, Zhongshan, Haikou, Kunming and Lhasa fully met the air quality standards. In addition, according to China's surface water environment monitoring data, water with quality types I, II and III¹ accounted for 64.5 per cent of the total, while nearly 40 per cent did not meet the water quality standards in 2015.

Therefore, in the face of the highly carbonised and unsustainable traditional mode of urbanisation, new urbanisation—incorporating effective resource utilisation and environmental protection—is essential. Both academia and government departments have reached consensus on a new pattern of intensive, smart, low-carbon and green urbanisation. Premier Li Keqiang (2012) has said the new urbanisation should follow an intensive and low-carbon development mode, emphasising the efficient utilisation of natural resources and energy. Wei and Zhang (2011) and Gu (2013) hold that new urbanisation should take the road of green urbanisation and green governance.

New urbanisation with sustainable economic growth

At present, the environment of urbanisation development is undergoing profound changes in both China and globally, with traditional processes—promoted by traditional manufacturing industries—facing difficulties. Therefore, it is imperative to achieve industrial transformation and upgrading and take a new road of urbanisation with sustainable economic growth.

¹ According to surface water environmental quality standards, water meeting quality types I, II and III can be used for drinking.

Traditionally, urban economic development has followed the investment and export-oriented model; however, the current development environment in China poses a severe challenge to the momentum of this model. The investment-oriented development model has made tremendous contributions to China's rapid economic development over the past few decades, but overreliance on investment for economic development is not sustainable. The RMB4 trillion rescue plan initiated in response to the Global Financial Crisis (GFC) in 2008 is a case in point. Government-led investment in infrastructure and real estate not only failed to solve the substantive problems in economic development, but also worsened structural contradictions and caused overproduction and other problems. In addition, the results of the sixth census (2010) of China indicate that the number of people over the age of 60 is 178 million—13.26 per cent of the total population and an increase of 2.93 percentage points compared with 2000. Moreover, under the influence of China's family planning policy, the proportion of the population born in the 1990s and 2000s is far below the current proportion of middle-aged and elderly people. The disappearance of the demographic dividend has already had an impact on China's export-oriented economy, which previously developed vigorously thanks to an unlimited supply of cheap labour. In addition, China's export-oriented economy, dominated by manufacturing industries, is at the lowest point of the 'smiling curve' and can obtain only extremely meagre profits in the global value chain. Therefore, with the rise of labour costs, the shortage of external demand caused by the GFC, the return of manufacturing industries to Europe and the United States and the shift of others to developing countries such as Vietnam and India, which have lower labour and land resource costs, the export-oriented development mode can no longer be regarded as a economic engine of China's future urbanisation.

A serious imbalance in industrial structure means this cannot be the core driver of urbanisation. To achieve the new urbanisation, industrial transformation and upgrading from traditional manufacturing to modern service industries must be realised. Li (2012) points out that the new urbanisation requires, in particular, the development of service industries. Currently, service industries in developed countries account for more than 70 per cent of total output value, which can absorb the maximum number of urban employees, and also helps to achieve the upgrading of the industrial structure. The impetus behind new urbanisation is not traditional investment and exports, but domestic 'green' consumption (Qiu 2009) and the synergistic development of urbanisation, industrialisation, informationalism and agricultural modernisation (Gu 2013).

New urbanisation with social justice and harmony

The traditional mode of urbanisation not only failed to realise common prosperity, but also caused social injustice and a widening of the gap between the rich and the poor. Therefore, pursuit of social justice and harmony has become an inevitable requirement of the new urbanisation, putting people at the core.

In 2014, the proportion of the rural population in China's total population was as high as 45 per cent, while total output from the agricultural sector was only 16 per cent of the national total, with a downward trend. At the same time, the urban population (including migrant workers from rural areas) represented only 55 per cent of the total population, but generated 84 per cent of national output, with a growing trend. That means 45 per cent of the population received only 16 per cent of total national income, while 55 per cent of the population received 84 per cent of total income (Figure 23.1), which indicates the paradox of socioeconomic development in China—that is, the coexistence of rising national income and rural poverty (Wen 2014).

Figure 23.1 National income comparison between urban and rural populations

Source: NBS (2015c).

The obstruction caused by the *hukou* system is one important reason for this paradox (Wen 2014). Under the *hukou* system, large numbers of migrant workers cannot fully realise their citizenship in urban areas, nor can they enjoy basic public services in the city, including education, housing and medical care, which causes social problems for the children and elderly people left behind in rural areas. For example, in the Pearl River Delta, 20 million migrant workers were unemployed and without social security because of the GFC in 2008. In addition, the lack of integration of urban and rural land systems resulted in a lack of protection of farmers' property rights, and peasants whose land was expropriated found it difficult to receive fair compensation. Therefore, deepening people's urbanisation and pursuing social harmony and justice are essential requirements of the new urbanisation. This entails reform of the *hukou* and land systems from the institutional level.

New urbanisation with reasonable spatial structure

China's traditional mode of urbanisation was spatially unbalanced—for example, the urbanisation rate in the east of the country is much higher than in the central and western regions. According to data released by the NBS, in 2014, the urbanisation rate in eastern China was 61 per cent, while that in central China was 53 per cent and 49.7 per cent in the west. The regional differentiation of urbanisation levels is obvious, so it is imperative new urbanisation addresses this issue.

Mega-cities are agglomerated mainly in eastern China, which is also where urban diseases are mainly concentrated due to population expansion and relatively low level of city governance capacity. In central and western China, the development of mega-cities has been inadequate and the distribution of small and medium-sized cities and small towns is relatively loose. Due to the low levels of infrastructure and public services, socioeconomic development capacity is also hampered in central and western China. This spatial imbalance has led to large-scale regional population migration to the east and social problems associated with it, including for the children of migrants and elderly people left behind. Moreover, capital cities in all provinces have enjoyed rapid development due to favourable urban policies and resource levels, essentially creating a population–industrial agglomeration effect. However, the spillover effects of these cities on surrounding cities are weak. Therefore, further development of urbanisation should prevent the urban diseases and improve the city governance capacity. Metropolitan cluster development shall be adopted as the main strategy of promoting new urbanisation in order to construct polycentric metropolitan areas and to promote the transregional mobility of production factors. At the same time, development strategy should be implemented in light of local conditions and characteristics, embarking on a path of regional and urban–rural coordinated new urbanisation with reasonable spatial structure.

New urbanisation is inevitable in the era of globalisation and post-industrialisation. At present, all countries in the world experiencing the wave of globalisation have begun the transformation from traditional to post-industrialisation processes, including in urbanisation. As a national development strategy, China's urbanisation transformation has been concentrated in the development of new urbanisation. This, together with industrialisation, informationalism and agricultural modernisation, has created a path for synchronising the 'four modernisations' of sustainable development with Chinese characteristics. Among the four modernisations, urbanisation has special status, and accelerating that process is now a major task for China. After the eighteenth National Congress of the CPC explicitly proposed a road to new urbanisation with Chinese characteristics, the State Council promulgated its 'National New Urbanization Plan 2014–2020', which has positive strategic significance for the sustainable development of urbanisation (Hu and Pan 2014; Hu and Chen 2015). Since then, the thirteenth five-year plan has also put forward requirements for accelerating the pace of new urbanisation. The new urbanisation has therefore entered a new phase and its importance to China's future development is self-evident.

Defining new urbanisation

The concept of new urbanisation is rare in other countries. The most significant concept of urban renewal in the Western world is the theory of new urbanism, which emerged in the 1990s against the issue of urban sprawl, and which is considered the most influential global urban design trend of the past two decades. Although the theory of new urbanism has some value for the development of China's new urbanisation (Kong 2014), there are some essential differences with China in terms of the stage of medium-level development and rapid urbanisation and the definition of the concept of new urbanisation. The study of urbanisation in China has moved through conceptual stages—from urbanisation, to urbanisation with Chinese characteristics, to new urbanisation and to new urbanisation with Chinese characteristics—each stage of which is closely linked with national policies. Academics have been discussing the differences and connections between the concepts for a long time. This chapter focuses on new urbanisation, for which an accurate definition is a prerequisite for carrying out research. If there is no comprehensive and systematic understanding of new urbanisation, some aspects may be overemphasised while others are neglected in urbanisation practice, resulting in a situation in which some old problems are solved but many new ones arise (Hu 2013). Despite the name, new urbanisation is not a new concept, even though it does not yet have a unified definition. The basic idea is to explore a more quality-oriented approach to sustainable urbanisation, developing what is useful from traditional urbanisation and discarding what is not. The approach to sustainable urbanisation has become a heated topic, and the existing literature shows that different scholars hold diverging views (see Table 23.2).

Table 23.2 Definition of new urbanisation from selected literature

Scholars	Definitions
Hu (2005)	a) An idea of people-oriented and coordinated sustainable development; b) development of an intensive economy and a harmonious society as the goal; c) market mechanisms as the leading factor; d) large, medium and small cities have moderate scale, reasonable layout, coordinated structure, perfect network systems; e) interactive development with new industrialisation, informationalism and agricultural modernisation; f) support for industry, full employment opportunities, healthy ecological environment and urban–rural integration.
Wu et al. (2009)	New industrialisation and informationalism as driving forces to pursue an urbanisation path with urban–rural integration and coordinated development of population, economy, society, resources and the environment.
Qiu (2012)	From prioritising urban development to complementary urban–rural development, from high energy consumption to low energy consumption, from quantity of growth to quality improvement, from high environmental impact to low environmental impact, from extensive development to intensive development, from inequality to harmonious development.
Hu (2013)	Effective utilisation of natural resources, sustained economic growth, environmental protection, social fairness and harmony, rational spatial structure and smart cities; essentially a path of sustainable urbanisation.
Ni (2013)	a) Adhering to the principle of comprehensive, coordinated and sustainable development; b) population urbanisation as the core element; c) motivated by informationalism, agricultural industrialisation and new types of industrialisation; d) a model of intensified growth; e) government guidance and market mechanisms; f) sustainable development path to build an integrated urban–rural China.
Wei and Guan (2014)	Adhere to a path of people-centred, intensive intelligence, green and low carbon development, urban–rural integration and synchronisation of the four modernisations, with diversification, gradualism, intensiveness, harmony and sustainability.
Duan and Yin (2014)	Transformation from government-led to market-led; from exogenous urbanisation to endogenous urbanisation; from land urbanisation to population urbanisation; from an export and investment-driven economy to a consumption-driven economy; from one-dimensional economic goals to multidimensional goals of resource utilisation, environmental protection and social and economic development.
Li (2014)	People-oriented, low-carbon economy and new technology–led urbanisation.
Li et al. (2015)	Consideration of people as the core in overall planning, governance according to law and following a path of intensification and ecological protection to realise sustainable urbanisation.
Fang (2016)	Efficient and low-carbon, eco-friendly, economical and innovative, smart and safe, sustainable and healthy urbanisation.
Song and Jin (2016)	Urbanisation of lifestyles, employment patterns, public services, public space and social governance, and beautification of the living environment.

Source: Authors' selection from the relevant literature.

The literature review in Table 23.2 indicates that to draw a definition of new urbanisation, most scholars tend to start from a reflection on traditional urbanisation and compare the background, concept and goals of new and traditional urbanisation. The discussion has moved from abstract to concrete definitions. Although differences exist among scholars, some consensus has been reached on two aspects. The first is sustainable development, which is an inevitable choice for new urbanisation and the goal of all countries in the world. The second is people-centred urbanisation, which is an essential property of new urbanisation. The phenomenon of valuing materials more highly than people in urbanisation needs to be changed so that people's employment patterns, lifestyle, living environment and so on can be urbanised.

Traditionally, scholars understood the concept of sustainable development as the harmonious coexistence of humans and nature, embodied in the effective utilisation and protection of natural resources and the environment. In fact, sustainable development, in a broad sense, also includes sustainable organisational forms and institutional arrangements. Therefore, this chapter argues that new urbanisation is sustainable and people-centred urbanisation. This kind of sustainability manifests in the synergy between and balancing of the population, economy, natural resources and the environment, as well as sustainable institutional and planning arrangements. It entails not only the proper concentration of population and sustained economic growth, but also the efficient use of natural resources and environmental protection while demanding social fairness and harmony in institutional arrangements and rational spatial structure in urban planning.

Construction of an assessment indicator system for new urbanisation

After clarifying the definition of new urbanisation, it is necessary to discuss the empirical issues of it. There are normally two methods for measuring urbanisation. The first is the single-indicator method, using one indicator to measure the level of urbanisation. Relevant indicators include the proportions of the urban population and the nonagricultural population in overall population, the proportion of urban built-up areas in the country total, and so on. However, this method is prone to a one-sided pursuit of urban population growth or urban scale expansion. The other method of measurement is the composite indicators method, which measures the urbanisation level by building up an indicator system. However, traditional measurement indicators cannot cover all dimensions of new urbanisation. Against this background, we will establish a new indicator system to measure China's level of new urbanisation.

Literature review

Most research on the construction of a new urbanisation indicator system occurred after 2012. Scholars use various methods to construct indicator systems for different research areas and scales, such as urban agglomerations and provincial and prefecture-level cities (see Table 23.3). With the introduction of the concept of new urbanisation, more and more scholars are focusing on systematisation of urbanisation, and the research also shows a multidimensional trend.

Table 23.3 Study and measurement of new urbanisation indicator system by representative documents

Region	Scale	Scholars	Subject	Index
Nationwide	Province level	Yang (2013)	30 provinces	Five dimensions (economic, environmental, living, social, livelihood), 21 indicators
		Wang et al. (2015)	31 provinces	Four dimensions (economic, demographic, social, environmental), 23 indicators
Urban agglomeration	Prefecture level	Chang and Wang (2014)	3 provinces in Beijing–Tianjin–Hebei urban agglomeration	Five dimensions (public services, population, economy, social security, ecology), 21 indicators
		Yang et al. (2015)	8 cities in Shandong Peninsula urban agglomeration	Five dimensions (people-oriented, urban–rural planning, intensive and efficient, ecological, cultural) 100 indicators
Province	Prefecture level	Wang et al. (2013)	11 cities in Jiangxi province	Four dimensions (economy, population, infrastructure, environment), 15 indicators
		Wang et al. (2016)	11 cities in Hebei province	Four dimensions (economic, ecological, urban and rural areas, public services), 20 indicators
Prefecture-level city	Prefecture level	Guo et al. (2013)	Langfang	Five dimensions (population, living, economy, society, environment), 36 indicators
		Wang (2016)	Nanjing	Four dimensions (economic, social, population, spatial), 28 indicators
Province	County level	Xu and Zhong (2016)	18 counties in Hainan province	Seven dimensions (urbanisation level, public services, livelihood, facilities, environment, social economy, urban–rural coordination), 23 indicators
		Min et al. (2016)	District cities and 79 counties in Jiangxi Province	Six dimensions (population transfer, public services, economic development, urban construction, social management, urban–rural planning), 51 indicators

Source: Collected from relevant literature by the authors.

Several issues arise from consideration of the literature (Table 23.3). First, study of the basic theory is weak, and this lack of basic theoretical study—such as a definition of new urbanisation and the logical relationship between assessment and definition—is the root of the evaluation bias and insufficient applicability. Second, although some studies have defined the concept of new urbanisation, construction of an indicator system is limited in terms of the discussion level and empirical research. A one-sided pursuit of every aspect of the indicator system's construction may lead to a lack of internal logical connection among indicators. If such a system, lacking internal relations, is used for the assessment of new urbanisation, we may split the dimensions of urbanisation or risk conflict among the indicators, and fail to truly reflect the connotation of new urbanisation and cut off the relationship between normative and empirical research. Third, the existing literature rarely looks at the spatial patterns in new urbanisation in China; however, recognition of such patterns is a prerequisite for coordinated development. In view of the above problems, it is necessary to first clarify the theoretical issues and, further, based on a certain theoretical framework, guide the construction and application of a system of multidimensional assessment indicators.

Construction of the indicator system and explanations

The construction of the indicator system for new urbanisation in this chapter focuses mainly on multidimensional perspectives, aiming to overcome the limitations of the previously mentioned methods. Drawing on the existing relevant research, we construct a new urbanisation assessment indicators system with six dimensions—population, economy, natural resources, environment, social development and spatial aspects—which embody moderate population aggregation, sustained economic growth, efficient use of natural resources, environmental protection, social justice and harmony and reasonable spatial structure. Three representative indicators of each dimension are selected, and there are 18 specific indicators in total (see Table 23.4). The six dimensions are interrelated and work together to promote the development of new urbanisation. Among them, the proper concentration of population and sustained economic growth are the fundamental driving forces and the basis of and material guarantee for the coordinated development of all dimensions. The effective utilisation of natural resources and environmental protection are inevitable choices for sustained economic growth and structural transformation in the construction of new urbanisation in the new era in China. Social justice and harmony are at the core of realising people-oriented urbanisation. A rational spatial structure is an important task in coordinating regional and urban–rural development. Based on these considerations, a new urbanisation assessment indicator system with multidimensional perspectives will help to better grasp development goals at an integrated level and reflect the different characteristics and main problems of specific cities, which has important practical implications. In addition to the general

principle of indicator selection—such as comprehensiveness, representativeness and data availability—it is worth noting that we use an extra ‘outcome-oriented’ principle to avoid double counting or the offset between positive and negative indicators. For example, with regard to the efficient use of natural resources, we will focus on how much benefit relevant investment has generated rather than on the investment itself; in terms of environmental protection, we will focus on what level of emissions achieves the standard instead of just the emissions level.

Table 23.4 Evaluation indicator system for China's new urbanisation

Target level	Level-two indicators	Level-three indicators	Indicator type	Indicator weight (%)
China's New Urbanisation Index (NUI)	Population dimension	Population density	Positive	5.6
		Urbanisation rate	Positive	5.6
		Proportion of temporary resident population to permanent resident population	Negative	5.6
	Economic dimension	GDP per capita	Positive	5.6
		Advancement index ¹ of industrial structure	Positive	5.6
		GDP growth rate	Positive	5.6
	Natural resources dimension	Unit GDP water consumption	Negative	5.6
		Unit GDP land consumption	Negative	5.6
		Unit GDP electricity consumption	Negative	5.6
	Environmental dimension	Number of days that meet air quality standards	Positive	5.6
		Sewage treatment rate	Positive	5.6
		Domestic waste treatment rate	Positive	5.6
	Social dimension	Urban–rural income ratio ²	Moderate	5.6
		Coverage rate of social security ³	Positive	5.6
		Number of undergraduate universities per 10,000 college students ⁴	Negative	5.6
	Spatial dimension	Road area per capita	Positive	5.6
		Rate of urban greenery coverage in built-up area	Positive	5.6
		Ratio of urban built-up area to total area	Positive	5.6

¹ Advancement index of industrial structure (written as W) is calculated as follows: first, according to the three industrial divisions, GDP will be divided into three parts, the proportion of each part's added value of GDP as a component of a space vector, thus a three-dimensional vector can be written as $X_0 = (x_1, 0, x_2, 0, x_3, 0)$. Then calculate the angles θ_1 , θ_2 and θ_3 between X_0 and the vectors $X_1 = (1, 0, 0)$, $X_2 = (0, 1, 0)$ and $X_3 = (0, 0, 1)$, respectively, which are arranged from the lower industrial

level to the higher level. Where
$$\theta_j = \arccos \left(\frac{\sum_{i=1}^3 (x_{i,j} \cdot x_{i,0})}{\sum_{i=1}^3 (x_{i,j}^2)^{1/2} \cdot \sum_{i=1}^3 (x_{i,0}^2)^{1/2}} \right), j = 1, 2, 3.$$
 Second, the formula for the value W is: $W = \sum_{k=1}^3 \sum_{j=1}^k \theta_j$. The higher the value of W , the higher is the level of industrial structure (Fu 2010).

² The urban–rural income ratio is the ratio of the per capita disposable income of urban residents to that of rural residents.

³ Social security coverage is the arithmetical average of pension insurance coverage, medical insurance coverage and unemployment insurance coverage.

⁴ The ratio of the number of schools above undergraduate level per 10,000 undergraduate students.

Population dimension

Population concentration not only provides an important impetus to the process of urbanisation, but also reflects the results of urbanisation. It is therefore important in interpreting the level of urbanisation. In addition, population concentration integrates with many other important elements in the system of urbanisation, including the economy, society and the environment. In China's current stage of rapid urbanisation, many serious problems have been caused by the imbalance of various factors. It is imperative to explore a new path of urbanisation with moderate population concentration. With this in mind, two extra population indicators are selected while retaining the urbanisation rate: the obstacles posed by the *hukou* system and the carrying capacity of cities—that is, the share of the temporary resident population in the total resident population and urban population density, respectively. In a general sense, the population share of temporary residents reflects the mobility of the urban population and is also an indication of the attractiveness and vitality of a city. The reality of urbanisation in China at present, however, means the impeding effect of the *hukou* system on urbanisation is more evident, so we consider it a negative indicator.

Economic dimension

Sustained economic growth is the fundamental driver of new urbanisation. Based on the statistical indicators of existing economic sectors, three representative aspects are chosen: efficiency, structure and scale. Among them, GDP per capita represents economic performance and reflects the economic efficiency of production; the advancement index of industrial structure represents the economic structure. Industrial transformation and upgrading are the basis of sustainable development of the urban economy and the precondition for achieving new urbanisation, while the GDP growth rate characterises the economic scale and embodies economic growth. The three indicators are positive, confirming the sustainable development capacity of urban economy from a macro point of view.

Natural resources dimension

New urbanisation relies on the effective use of natural resources (Hu 2013), which is also a necessary requirement for sustainable development. In this dimension, to represent the three natural resources of water, land and energy utilisation efficiency, three negative indicators are chosen—unit GDP water consumption, unit GDP land consumption and unit GDP electricity consumption, respectively—to highlight the path of lower resource consumption for transformation to new urbanisation. The objective is to change the traditional urbanisation mode of high energy consumption. At the same time, it is consistent with the theory of new multidimensional urbanisation in developing new industrial system, such as low-carbon economy, recycling economy and green economy. Given the availability of data, this chapter replaces unit GDP energy consumption with unit GDP electricity consumption.

Environmental dimension

Environmental quality is an important criterion for measuring whether a city is liveable. Compared with traditional urbanisation, the new mode of urbanisation is reflected in the level of environmental protection and the sustainable development of the city, and is an important measure of whether or not humans and nature can coexist harmoniously. In terms of specific indicators, the sewage treatment rate, garbage disposal rate and number of days that meet air quality standards are selected as the indicators for water, garbage and air quality, respectively, which are related to the human living environment.

Social dimension

Social justice and harmony are at the core of realising people-centred new urbanisation. The theory of new urbanisation based on a multidimensional perspective holds that social justice and harmony mean coordination and protection of the public interest so that social fairness and justice can be effectively realised and maintained. The *hukou* system and public service provision are two important issues here. The relevant indicator for measuring the negative effects of the *hukou* system has been dealt with in the population dimension and will not be repeated here. In regard to public services, we select the social security coverage rate and the rate of undergraduate schools per 10,000 college students. The social security coverage rate is a composite index covering aspects of unemployment, health and pensions, and is an important measure of social welfare and an important factor in social stability. The rate of undergraduate universities per 10,000 college students embodies the

problem of the fair distribution of educational resources, which is a hot issue in the current urbanisation process. The urban–rural income ratio characterises the differences in income between urban and rural areas, indicating the degree of social equity. The index is moderate in nature; some scholars think that a ratio of 1:1.2 is best (Wu et al. 2013)—and we agree.

Spatial dimension

Achieving a reasonable spatial structure is an important task in coordinating urban–rural and regional development and promoting new urbanisation. Theory and experience show that urban planning needs to avoid urban sprawl and other spatial issues, and that compactness in urban layout must be a basic feature of new urbanisation. To some extent, urban spatial structure is reflected in three main aspects: urban density, urban layout and urban morphology. At the same time, keeping the greenery rate as high as possible while building a compact city structurally is a challenging but necessary task. Based on the above criteria, three quantitative indicators are selected: per capita road area, greenery coverage rate and proportion of urban built-up area. Per capita road area and greenery coverage rate characterise the urban layout, in which the per capita road area represents traffic and commuter convenience in urban areas; and the greenery coverage rate reflects environmental liveability. In theory, there are reasonable standards for these measures, but for most cities in China, the current situation follows the idea that bigger is better (Wu et al. 2013). Urban morphology is closely related to the topography of the city; because of the lack of comparability of topographical features between cities, the proportion of urban built-up area in the total area is instead used to represent the urban scale. In addition, indicators of land use and population density are overlapped with urban density, so relevant indicators will not be selected again.

Research subject, method and data source

Subject

Based on the availability of data, this chapter takes as research objects 289 prefecture-level cities in China, excluding Taiwan Province, Sansha, Hong Kong and Macau.

Method

Data standardisation

Because the magnitude of each indicator is different and the different indicators are not directly comparable, they cannot be calculated directly. Therefore, it is necessary to standardise the raw data in data processing. This chapter uses the maximum difference standardisation method to conduct data standardisation, the formulas for which are as follows (Equations 23.1 and 23.2).

Equation 23.1

If the indicator is positive: $X_{ij} = [\max_j(x_{ij}) - x_{ij}] / [\max_j(x_{ij}) - \min_j(x_{ij})]$

Equation 23.2

If the indicator is negative: $X_{ij} = [x_{ij} - \min_j(x_{ij})] / [\max_j(x_{ij}) - \min_j(x_{ij})]$

Although the urban–rural income ratio is a moderate indicator, its minimum value is 1.2, so it is suitable for the negative standardisation formula.

Index calculation

The general idea of index calculation is to weight each indicator and then sum to a weighted average. Common methods of weighting include the subjective weighting method (AHP, Delphi method), the objective weighting method (entropy method) and the comprehensive weighting method. Among them, a subjective weighting method, such as AHP, is an effective decision-making method combining quantitative and qualitative analysis, but this method has a lot of human interference. Although the objective weighting method has strong objectivity, it is easy to ignore the influence of data errors on the evaluation result, which will fail to reflect the reality of the complex evaluation object. The subjective and objective comprehensive weighting methods cannot completely eliminate the scientific failure of decision-making caused by the above drawbacks. More importantly, new urbanisation is sustainable urbanisation, which emphasises multidimensional synergy in the process of urbanisation. Therefore, to highlight the equal importance of each dimension, this chapter will calculate the index using the average weights method.

Data sources

The data collection year is 2014. The data are collected from the *China Urban Statistical Yearbook 2015* (NBS 2015e), and the missing values are supplemented by the *China Urban Construction Statistical Yearbook 2015* (NBS 2015d). The data

for the proportion of temporary residents in the total resident population are taken from NBS (2015b); the urbanisation rate is from NBS (2015a) and the statistical communiqués of national economy and social development in 2014, the government work reports in 2015 and news portals of various provinces and cities. Given that the urbanisation rate in Shenzhen and Karamay is 100 per cent, the urban–rural income ratio cannot be calculated for these cities. For the data calculations to have mathematical meaning, such cities are treated at the optimal value—that is, the urban–rural income ratio is 1.2. The indicator for the number of days that meet air quality standards is from *China Environmental Statistical Yearbook* (NBS 2015b), *Statistical Yearbook of Provinces and Cities 2015* (NBS 2015f), *Statistical Bulletin of National Economic and Social Development* (NBS 2014) and the Ministry of Environmental Protection’s data centre website;² the numbers of universities in different cities are from the Ministry of Education’s website;³ national-level data are from the *China Statistical Yearbook 2015* (NBS 2015c) and *China City Statistical Yearbook 2015* (NBS 2015a).

Results

Basic situation of China’s new urbanisation

Through our calculations, we obtain the new urbanisation indexes (NUIs) for the country as a whole and for 289 cities above the prefecture level. We divide the country into three regions—east, central and west—and mark the NUIs of cities in various regions on the axes from largest to smallest (as shown in Figure 23.2). This indicates that the maximum and minimum NUIs in the east are larger than those in central and western China, and the maximum NUI in the central region is much the same as that in the west, but its minimum NUI is higher than that in the west, indicating that the new urbanisation level in the east is higher than that in the central and western regions, while that in central China is slightly higher than that in the west. China’s new urbanisation level follows a stepwise decreasing pattern, from the east to the centre and then to the west. As a whole, this is in line with the regional differences in levels of socioeconomic development in China—that is, the more developed socioeconomic regions have higher NUIs. In addition, the difference between maximum and minimum NUIs is 27.93 percentage points in the east, which is more than that in the west (23.51 percentage points) and the centre (20.05 percentage points), indicating that central China has the smallest variation in the new urbanisation level. Although the new urbanisation level in eastern China is predominant as a whole, the differences among cities in this region

² See datacenter.mep.gov.cn/websjzx/queryIndex.vm.

³ See www.moe.edu.cn.

are more pronounced than those in the central and western regions, raising even more serious problems for coordinated regional development. At the national level, China's NUI in 2014 was 47.75 per cent, which is 7.02 percentage points lower than the national urbanisation rate (54.77 per cent). This shows that the urbanisation rate overestimated China's new urbanisation level.

Figure 23.2 Regional distribution of city NUIs in China

Source: Authors' calculation.

Table 23.5 shows China's top 15 and bottom 15 cities in terms of NUIs. It can be observed that the top 15 cities are all in the east of the country. Among them, Shenzhen ranks first; its performance in the six dimensions is balanced and it leads the rest of the country. Shanghai and Beijing are dragged down on the environmental dimension (Shanghai ranks 144 and Beijing ranks 251 in the environmental dimension); they rank second and third, respectively, overall. With the exception of Shenzhen, although there are some differences in the rankings between the NUI and the urbanisation rate, the differences are relatively small; the bottom 15 cities are in central, western and north-eastern China. It is noteworthy that the ranking of NUIs is significantly different from that of urbanisation rates in Yichun and Hegang, due mainly to the poor level of sustainable economic development and inefficient use of resources in both cities. Water, electricity and land resource utilisation efficiencies are significantly lower than the national average, seriously restricting the development of new urbanisation.

Table 23.5 NUI rankings of the top 15 and bottom 15 Chinese cities

City	NUI		Urbanisation rate		Ranking difference ¹	City	NUI		Urbanisation rate		Ranking difference
	Value (%)	Rank	Value (%)	Rank			Value (%)	Rank	Value (%)	Rank	
Shenzhen	74.78	1	100.00	1	0	Zhongwei	46.58	275	32.74	265	-10
Shanghai	69.41	2	89.60	7	5	Baise	46.57	276	57.54	283	7
Beijing	68.84	3	86.35	12	9	Qingyang	46.24	277	31.55	284	7
Zhuhai	66.36	4	87.87	11	7	Xinzhou	46.13	278	44.45	209	-69
Shantou	65.53	5	69.85	46	41	Yuncheng	46.05	279	44.70	215	-64
Xiamen	65.18	6	88.80	9	3	Tianshui	44.92	280	33.91	279	-1
Dongguan	64.66	7	88.81	8	1	Ganzhou	44.86	281	33.14	223	-58
Nanjing	64.30	8	80.90	18	10	Yichun	44.69	282	43.99	15	-267
Tianjin	63.76	9	82.27	17	8	Haidong	44.62	283	35.35	282	-1
Wuxi	63.75	10	74.50	30	20	Chongzuo	44.38	284	84.00	274	-10
Zhoushan	63.38	11	66.30	62	51	Dingxi	43.93	285	28.77	287	2
Guangzhou	63.21	12	85.43	13	1	Lhasa	43.72	286	46.15	190	-96
Suzhou	63.20	13	74.00	31	18	Baiyin	43.10	287	44.39	216	-71
Zhongshan	62.96	14	88.07	10	-4	Hegang	42.19	288	76.59	25	-263
Weihai	62.81	15	61.32	82	67	Longnan	39.17	289	26.65	289	0

¹ The difference between ranking for the urbanisation rate and for the NUI.

Relationship between the NUI and the urbanisation rate

Traditionally, the urbanisation level is measured by the urbanisation rate—that is, the proportion of the urban population in the total population, which is equivalent to giving the indicator 100 per cent weight. It is clear that the traditional mode of urbanisation emphasises quantity of growth, while new urbanisation emphasises multidimensional synergistic development. Therefore, one of the purposes of constructing the new urbanisation indicator system is to weaken the weight of the urbanisation rate and increase the weights of indicators in other dimensions, achieving multidimensional and synergistic cooperation, which means that new urbanisation pays greater attention to the quality of development. Therefore, there is a big difference between the two modes in terms of quantity.

Figure 23.3 Relationship between NUI and urbanisation rate

Source: According to the authors' calculation.

Figure 23.3 depicts the linear relationship between the NUI and the urbanisation rate for cities in China. Intuitively, the slope of the line of fit is 0.2571. The statistical meaning can be expressed by saying that for every 1 per cent increase in the urbanisation rate, the NUI increases by only 0.2571 per cent, which is a significant mismatch. On the other hand, the fitting coefficient is only 53.28 per cent, which means that the linear relationship can explain only 53.28 per cent of the relationship between the two, indicating a positive correlation to a certain extent—that is, the higher the urbanisation rate, the higher is the NUI (for example, Shenzhen and

Shanghai); however, this is not always the case (for example, Yichun and Hegang). Therefore, new urbanisation is not simply a process of gathering the population in cities, but is more about the all-round development of cities, including the six dimensions of population, economy, resources, environment, society and space. The formulation of a new urbanisation plan also needs to change traditional thinking and shift from the single-dimensional perspective on the urbanisation rate to multidimensional perspectives.

Previously, it was believed that urbanisation is admittedly related to geographical, anthropological and sociological factors. However, economic factors determine the origin and development of cities in a much deeper level. Economic variables are the overriding factor (Bairoch 1991: 21).

There has been extensive debate in academic circles about the profound interaction between urbanisation and economic development. However, the related research is based more on the traditional measurement of urbanisation, providing relatively insufficient discussion of the relationship between new urbanisation and economic development. Because new urbanisation involves richer considerations of all dimensions of urban development compared with the traditional mode, the relationship between new urbanisation and economic development needs to be reconsidered.

Figure 23.4 depicts the quantitative relationship between the NUI, the urbanisation rate and economic development, in which GDP per capita characterises economic development. It can be observed that both the NUI and the urbanisation rate have a positive correlation with GDP per capita, which is consistent with the previous discussions. However, comparing Figures 23.4a and 23.4b, there is a certain difference between the two relationships. In the statistical sense, when GDP per capita increases by 1 unit, the NUI will increase by 0.013 percentage points and the urbanisation rate will increase by 0.038 percentage points. Therefore, the degree of correlation between GDP per capita and the urbanisation rate is three times that between GDP per capita and the NUI. Urbanisation has traditionally been heavily dependent on economic development and it proves Bairoch's (1991) assertion that economic variables are an overriding factor. Thus, economic development has become important in promoting the process of urbanisation; however, its role in this is far weaker than its role in promoting traditional urbanisation. The concept of new urbanisation weakens the influence of economic variables and emphasises multidimensional synergy, of which economic development is only one dimension.

(a) NUI and GDP Per capita (10,000 yuan)

(b) Urbanisation Rate and GDP Per capita (10,000 yuan)

Figure 23.4 Relationships between new urbanisation, the urbanisation rate and economic development

Source: Authors' calculation.

Spatial distribution of China's new urbanisation

Spatial distribution comparison between the NUI and the urbanisation rate

To explore the spatial distribution pattern of China's new urbanisation, ArcGIS 10.0 software was used to make a spatial visualisation of the NUI and urbanisation rate rankings of cities above the prefecture level in China (see Figure 23.5). As can be seen from Figure 23.5a, the differences in NUI between regions and cities in China are significant. The top 15 cities for the NUI are all in the eastern coastal areas and are

distributed mainly in three major economic circles—namely, the Beijing–Tianjin–Hebei, Yangtze River Delta and Pearl River Delta areas. The spatial distribution of the bottom 15 cities, however, is relatively scattered, but most are in north-eastern, central and western China.

Figure 23.5 Spatial distributions of NUI and urbanisation rate rankings of cities above prefecture level in China

Source: Authors' calculation.

As for the spatial distribution of the urbanisation rate (Figure 23.5b), it is similar to the distribution of the NUI—that is, decreasing in a stepwise manner from the east to the centre then the west. The differences can be observed as well. First, the top 15 cities for the rate of urbanisation are more scattered than those for the NUI, and are distributed in the north-eastern region, the north-western region and China's three major economic circles. Second, the bottom 15 cities for the urbanisation rate are more concentrated, in the west of the country, compared with distribution for the NUI. In addition, the urbanisation rates of most cities in north-eastern China are higher than the NUIs. From the spatial distribution differences of the NUI and the urbanisation rate, we can also see that if new urbanisation is measured by the rate of urbanisation, there will be some overestimations or underestimations. This is in line with the previous discussion of the relationship between new urbanisation and the urbanisation rate.

With the exception of Shenzhen, Guangzhou and Longnan, mismatches between the NUI and urbanisation rate rankings of cities are universal, but the degree of this mismatch differs significantly. The number of cities that are overrated⁴ is 127, accounting for 43.94 per cent of the total, and 159 cities are underrated, accounting for 55.02 per cent of the total. The mismatch degree is higher in cities in north-eastern China, where there is a concentration of cities whose rankings are overrated by more than 100 (ranking difference). Among them, Yichun has the largest degree of mismatch. Its NUI ranking is just 282, while its urbanisation rate rank is 15—a ranking gap of 267. The most underrated city is Maoming. Its NUI rank is 64, while its urbanisation rate rank is 260—a ranking gap of 196—due mainly to the fact the urbanisation rate indicator overlooks the city's performance in the dimensions of resource utilisation and environmental protection. Especially in the resource dimension, Maoming ranks significantly above the national average, in terms of water resources, electricity and land resource utilisation efficiencies.

As shown in Table 23.6, western China has the largest number of cities whose urbanisation rate overestimates their new urbanisation level, accounting for 16.61 per cent of the total number of cities and 37.8 per cent of the overestimated cities; the eastern region has the largest proportion of cities whose urbanisation rate underrates their new urbanisation level, accounting for 22.15 per cent of the total number of cities and 40.25 per cent of the total number of undervalued cities. This shows that using the urbanisation rate to measure the level of new urbanisation has, to an extent, dragged down the overall new urbanisation level in the east and pushed up that in the west.

⁴ The difference between ranking for the urbanisation rate and for the NUI refers to the value of the urbanisation ranking minus the ranking of the NUI. If the difference is positive, it means the urbanisation rate underrates the level of new urbanisation; if the difference is negative, it means the urbanisation rate overrates the level of new urbanisation.

As shown in Figure 23.6, the greater the ranking difference between the urbanisation rate and the NUI, the further the scattered points are from the 45° line. The area above the 45° line is the area in which the urbanisation rate underrated the level of new urbanisation, while below the 45° line is the area in which the urbanisation rate overrates the level of new urbanisation. We can see that cities such as Maoming and Zhanjiang belong to the group of cities that are seriously underrated, while Yichun and Hegang belong to the seriously overrated group.

Table 23.6 Regional distributions of NUI and urbanisation rate rankings of cities above prefecture level in China

Regions	Number of cities	Overrated		Underrated		No difference	
		Number of cities	Percentage of total number of cities (%)	Number of cities	Percentage of total number of cities (%)	Number of cities	Percentage of total number of cities (%)
Eastern	101	35	12.11	64	22.15	2	0.69
Central	100	44	15.22	56	19.38	0	0.00
Western	88	48	16.61	39	13.49	1	0.35
Nationwide	289	127	43.94	159	55.02	3	1.04

Source: Authors' calculation.

Figure 23.6 Ranking mismatches in the urbanisation rate and the NUI

Source: Authors' calculation.

China's new urbanisation dimensional spatial pattern

Figure 23.7 China's new urbanisation dimensional spatial pattern

Source: Authors' calculation.

Figure 23.7 depicts the dimensional spatial distributions of the levels of new urbanisation in China, including aspects of population, economy, resources, environment, society and space in cities above prefecture level. Several conclusions can be drawn. First, there is a high degree of similarity in the spatial distribution patterns of the population dimension and the urbanisation rate, indicating that population factors are the basis of both new and traditional modes of urbanisation. Second, there is a high degree of similarity in the spatial distribution pattern of the economy dimension and that of the NUI, which shows that although

new urbanisation weakens the role of economic variables, sustained economic development remains a driving force and is also the basis of, and material guarantee for, codevelopment between various dimensions. Third, cities in the eastern coastal areas rank relatively high and cities in the north-east rank relatively low in terms of the resources dimension (most of the bottom 15 cities are in the north-east). Fourth, in the environmental dimension, the rankings of cities in northern China are generally low, especially in the Beijing–Tianjin–Hebei economic zone, which indicates that environmental pressures are relatively high there. For example, in Shijiazhuang, fewer than 100 days in a year meet air quality standards. Fifth, in the social dimension, spatial distribution follows a stepwise decreasing pattern from the east to central China and then to the west, which means the degree of social fairness and harmony is higher in developed areas than in less developed areas. Sixth, in terms of the spatial dimension, the eastern coastal cities rank higher than cities in the north-east, centre and west, indicating that the urban spatial structure in the east is more reasonable, while that in north-eastern, central and western cities needs to be improved. In addition, most of the bottom 15 ranked cities are in the north-east and west, indicating that there is a long way to go in building new urbanisation in these two regions. In north-eastern China, in particular, a sluggish economy makes this even harder. It is noteworthy that some cities in western China have a comparative advantage in the environmental dimension, so making good use of this—for example, by developing eco-tourism—could provide a breakthrough in realising catch-up development of new urbanisation in this region.

Concluding remarks

Traditionally, urbanisation has been promoted through high consumption and high pollution, leading to problems such as difficulties with economic transformation, social injustice and an unbalanced spatial structure. China's unsustainable traditional mode of urbanisation needs to urgently shift to a sustainable and people-centred mode. It was in this context that the idea of new urbanisation came into being. The problem of defining new urbanisation has long been discussed in academic communities, and the process has shifted from an abstract to a concrete definition. Based on an analysis of the literature, we find that scholars have reached a consensus on at least two aspects of this definition. The first is sustainable development; in the process of urbanisation, as well as adhering to the principle of achieving a harmonious coexistence between humans and nature, sustainable organisational forms and institutional arrangements are also needed. The second aspect is putting people at the centre of urbanisation. The previous method of situations that urbanise 'material' rather than human in the course of urbanisation must be change. Therefore, the new urbanisation not only entails the proper concentration of population and sustained economic growth, but also entails effective use of

resources and calls for environment protection, while maintaining social fairness and harmony in institutional arrangements and rational spatial structure in urban planning. In order to explore the new urbanisation, its spatial pattern and its relationship with traditional urbanisation in China, this paper constructs a new indicator system of new urbanisation index. The empirical study shows that in 2014 China's NUI was 47.75 per cent, which is 7.02 percentage points lower than the national urbanisation rate (54.77 per cent), which indicate that the urbanisation rate overestimated the China's new urbanisation level. Therefore, if the new urbanisation level is measured using the urbanisation rate, there will be problems of overvaluation or undervaluation to varying degrees. Although economic factors are the main drivers of new urbanisation, their role is weaker than in traditional urbanisation—that is, the concept of new urbanisation weakens the influence of economic variables and stresses multidimensional coordination. In terms of spatial distribution, new urbanisation in China follows the regional distribution of the country's socioeconomic development, showing a stepwise decreasing spatial pattern from the east to the centre and then the west, which means that regions with higher socioeconomic development have higher NUIs.

A typical feature of traditional urbanisation is the simple pursuit of population concentration in urban areas, which is closely related to the traditional measurement of urbanisation (for example, the proportion of the urban population in total population or the proportion of urban built-up areas). This criterion has a direct impact on local governments' promotion of urbanisation, due to the one-sided emphasis on increasing the urban population and built-up areas, while ignoring aspects of resource utilisation, the environment, society and spatial structure, and eventually leading to unsustainable traditional urbanisation. The NUI developed in this chapter is a useful attempt to measure the rate of new urbanisation in the future. Compared with the urbanisation rate, the NUI emphasises that promotion of new urbanisation requires coordinated development in six dimensions, and any weak point in any dimension will drag down the new urbanisation level. Therefore, multidimensional new urbanisation requires a more accurate method for measuring urbanisation, and the establishment of a comprehensive and scientific assessment indicator system that will reflect the true level of new urbanisation.

The promotion of new urbanisation should adhere to practices of marketisation, intensification and ecological protection. First, urbanisation is a result of the logic of resource flows. The flow of resources such as people and capital is not based on the will of people, but is, rather, determined by market forces (Hu and Chen 2015). Therefore, new urbanisation must respect the power of the market, with proper government guidance. In reality, however, in China the government often controls urbanisation, which does not accord with the basic spirit of allowing the market to allocate resources. The regulation of urban administrative hierarchies is one such example. In the past, the development of heavy industry in north-eastern

China was strong and the effect of population agglomeration was remarkable. The state approved many prefecture-level cities in this region. Now, however, market forces have caused the flight of population and capital from this area, and some of the north-eastern cities cannot reach the standards of prefecture-level cities. In contrast, with the rapid development since China's period of reform and opening up, the economic improvement in some villages has resulted in a large population concentration and some have reached prefecture-level standards. All this is the result of market choices; however, further development of these cities and villages is subject to administrative regulation, and the market cannot lower or raise the administrative level of a city. Therefore, in the new urbanisation, we need to speed up reform of the administrative system and let the market determine the scale and speed of urbanisation.

Second, new urbanisation should focus on the efficient and intensive use of resources. Urban density is closely related to the intensive use of land resources, and plays an important role in urban development. The greater the urban density, the more developed will be the social division of labour, which is conducive to improvements in production efficiency. Increasing urban density can reduce information transaction costs and encourage the exchange of information and ideas, which can greatly benefit urban development (Zhou 2015). Therefore, it is necessary to change the 'sprawl' pattern of urbanisation in the future. Finally, the city is ultimately a typical complex ecosystem. Urbanisation is a process in which socioeconomic and environmental resource systems are constantly intertwined and coevolving. Cities are also the point of strongest interaction between socioeconomic and environmental resource systems. Therefore, we must look at urbanisation issues from a multidimensional perspective. If marketisation, intensification and ecological improvement are given enough attention, we can set the basic direction for new urbanisation. If, instead, we continue to promote traditional urbanisation, not only will the old problems remain, but also new problems may arise.

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